Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

Please cancel claims 1-14.

15. (New) A spark ignition internal combustion engine, comprising:

a fuel mixture portion that mixes a high-octane fuel and a low-octane fuel based on a variable mixing proportion, and supplies a mixed fuel into a combustion chamber,

a first mixing proportion adjusting portion that sets a standard octane number in accordance with an operation state of the spark ignition internal combustion engine, adjusts a mixing proportion between the high-octane fuel and the low-octane fuel so as to achieve the standard octane number, and uses the adjusted mixing proportion as a first mixing proportion;

a reference ignition timing setting portion that sets a reference ignition timing corresponding to the standard octane number

a knocking measurement portion that measures a state of occurrence of knocking in an operation state where fuel is injected based on the first mixing proportion and ignition is performed at the reference iginition timing

a deviation determination portion that determines a deviation value between an actual mixing proportion between the high-octane fuel and the low-octane fuel really supplied into the combustion chamber and the first mixing proportion, the deviation value being set based on the measured state of occurrence of knocking;and

a second mixing proportion estimation portion that estimates a mixing proportion between the high-octane fuel and the low-octane fuel based on the deviation value, and uses the estimated mixing proportion as a second mixing proportion.

16. (New) The spark ignition internal combustion engine according to claim 15, further comprising: a mixing proportion changing portion that, if the second mixing proportion is different from the first mixing proportion, changes an amount of the high-octane fuel and/or an amount of the low-octane fuel supplied into the combustion chamber so that the mixing proportion becomes substantially equal to the first mixing proportion.

17. (New) The spark ignition internal combustion engine according to claim 15, wherein, if knocking does not occur in the operation state where fuel is injected based on the first mixing proportion and ignition is performed at the reference ignition timing, the ignition timing is advanced.

18. (New) The spark ignition internal combustion engine according to claim 15 wherein, if knocking occurs in the operation state where fuel is injected based on the first mixing proportion and ignition is performed at the reference ignition timing, a proportion of the high-octane fuel is increased.

19. (New) The spark ignition internal combustion engine according to claim 15, wherein the knocking measurement portion executes a knock control of retarding the ignition timing in accordance with a strength of knocking when knocking occurs, and the second mixing proportion estimation portion estimates the second mixing proportion based on an amount of retardation of the ignition timing caused by the knock control.

20. (New) The spark ignition internal combustion engine according to claim 19, wherein the amount of retardation of the ignition timing caused by the knock control is corrected by an intake air temperature.

21. (New) The spark ignition internal combustion engine according to claim 15, wherein the fuel mixture portion mixes the high-octane fuel and the low-octane fuel so as to achieve the standard octane number based on a known nominal octane number of the high-octane fuel and a known nominal octane number of the low-octane fuel.

22. (New) The spark ignition internal combustion engine according to claim 15, further comprising an actual octane number detection portion adapted for detecting an actual octane number of the low-octane fuel and an actual octane number of the high-octane fuel, wherein the fuel mixture portion calculates a mixing proportion between the high-octane fuel and the low-octane fuel in accordance with the operation state so as to achieve the standard octane number based on the actual octane number of the high-octane fuel detected by the actual octane number detection portion and the actual octane number of the low-octane fuel detected by the actual octane number detection portion.

23. (New) The spark ignition internal combustion engine according to claim 22, wherein the actual octane number detection portion sets a mixing proportion of the low-octane fuel at 100% ; measures the state of occurrence of knocking in an operation state where fuel is injected based on the 100% low-octane fuel mixing proportion and ignition is performed at the reference ignition timing; determines the actual octane number of the low-octane fuel based on the measured state of occurrence of knocking; mixes the low-octane fuel whose actual octane number has been determined with the high-octane fuel at a predetermined proportion; measures the state of occurrence of knocking in an operation state where fuel is injected based on the predetermined proportion and ignition is performed at the reference ignition timing, and determines the actual octane number of the high-octane fuel based on the measured state of occurrence of knocking.

24. (New) The spark ignition internal combustion engine according to claim 15, further comprising a fuel separator device that separates a fuel into the high-octane fuel and the low-octane fuel, wherein the second mixing proportion estimation portion determines whether the fuel separator device is normally operating so as to separate the fuel into the high-octane fuel having a predetermined octane number and the low-octane fuel having a predetermined octane number.

25. (New) The spark ignition internal combustion engine according to claim 24, the second mixing proportion estimation portion determines that an operation of the fuel separator device is abnormal if the deviation value between the second mixing proportion determined based on the state of occurrence of knocking and the first mixing proportion is greater than a predetermined criterion value.

26. (New) The spark ignition internal combustion engine according to claim 15, further comprising a fuel injection device that injects the high-octane fuel and the low-octane fuel based on the first mixing proportion.

27. (New) A method for estimating a mixing proportion between a high-octane fuel and a low-octane fuel which is supplied into a combustion chamber of a spark ignition internal combustion engine, comprising the steps of:

a first step of setting a standard octane number in accordance with an operation state of the spark ignition internal combustion engine;

a second step of adjusting a mixing proportion between the high-octane fuel and the low-octane fuel so as to achieve the standard octane number, and using the adjusted mixing proportion as a first mixing proportion;

a third step of setting a reference ignition timing corresponding to the standard octane number;

a fourth step of measuring a state of occurrence of knocking in an operation state where fuel is injected based on the first mixing proportion and ignition is performed at the reference ignition timing;

a fifth step of determining a deviation value between an actual mixing proportion between the high octane fuel and the low octane fuel really supplied into the combustion chamber and the first mixing proportion, the deviation value being set based on the measured state of occurrence of knocking; and

a sixth step of estimating a mixing proportion between the high-octane fuel and the low-octane fuel based on the deviation value, and using the estimated mixing proportion as a second mixing proportion.

28. (New) The method according to claim 27, further comprising a fuel injection step during which high-octane fuel and low-octane fuel are injected based on the first mixing proportion.